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Opinion

In the Face of Blazing Furnace of Pandemic; Would Immunoinformatics Not be a Rescuer?

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The more the emerging challenges in the management and the control of emerging and re-emerging of infections, the more the needs for new altitudes, tools and strategies targeted at combating them. Most infectious agents show a significant degree of host specificity, causing great fatalities and mortality in their hosts' species. What determines host preference for every agent is not known, but the mechanisms requirement for its establishment/survival and subsequent attachment to a particular cell-surface molecule is one critical factor. For example the Spanish flu pandemic between 1918 - 1920 recorded fatalities of an estimated 50 - 100 million lives loss. The rinderpest spread to Eastern Africa in the nineteenth century, caused massive death in livestock with the resultant death by starvation of almost two-thirds of the East African Massai population. The potato blight which cause the Irish potato famine led to reducing the Irish population by 25% as a result of starvation or migration. The Black plague that killed more than 75 million people between the year 1347 and 1351 was not as worse-of as lives lost to the pandemic of COVID-19. The modern trend offers a great deal for the production and development of personalized vaccine with records of being safe, mildest, efficient, and effective without the worries of side effects. There had to be several trials and experimentations, the whole process will take a shorter years to achieve compared to the traditional vaccine that normally takes decades.

Amidst the devastating episodes of fatalities due to these infections; there came the rescue of Edward Jenner for his intervention on vaccinations, with each component stimulating a different arm of the immune system. A vaccine is a biological product that can be used to safely induce an immune response that confers protection against infection and/or disease on subsequent exposure to a pathogen. To achieve this, the vaccine must contain antigens that are either derived from the pathogen or produced synthetically to represent components of the pathogen so as to elicit an immune response. This could be greeted with immunological failure due to mutation in the genome thereby can revert back to the more virulent form and re-infect human host. Also there has also been the fear of causing allergy to a susceptible hosts. Also, the need to store, manage and analyze rapidly growing challenges gave rise to the rescuer field of immunoinformatics. In the modern world, immunology research is characterized by the production of increasingly vast amounts of data, fueled by both host and parasites' genomics and proteomics projects of large-scale screening of pathogen- and antigen-host interactions. Immunoinformatics represents computational methods and resources that are used in the study of immune function. It lies at the intersection of experimental and computational sciences and encompasses domain-specific databases, computational models and strategies drawn from artificial intelligence. Systemic modeling with focus on simulating the behavior of cells or whole organs are used for applications tracking the course of infection or optimization of immunization protocols. Immunomics is however the large-scale screening of immune processes, which includes powerful immunoinformatics tools, offers great promise for future translation of basic immunology research advances into clinical practice.

I hereby put forward immunoinformatics as the modern effort geared towards personalized vaccine that are designed to functions according to the genomic studies of both the hosts' and the viral genomes. The current trend of immunoinformatics holds a promising preparedness geared at curtailing whatever changing dynamism in the host-parasite relationships.

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